

passing down the middle connecting with a blow-off valve. Opening this valve at intervals of one to six months and permitting the entire chamber to drain takes care of most of the sludge.

The filters must be so designed that they can be washed very rapidly and very thoroughly. This is done by simply reversing the current in the case of the pressure filter and forcing the water up through it at a high rate of speed.

For every ten parts per million of alkalinity that the water contains one grain of sulphate of alumina per gallon can be used with safety, because this quantity of alkali will combine with the alum to convert it into an insoluble substance, hydrate of alumina, which is readily removed by the filters, and sulphate of lime. In other words, the carbonate of lime existing in the water renders the alum insoluble and converts it into a form in which the filter can hold it.

From the foregoing it will be seen that chemical treatment in many industrial problems is as important as the apparatus employed, and if the problem is met by the use of a well designed plant employing the proper chemicals, there is no reason why the most polluted rivers and streams cannot be used for all industrial purposes.

THE FORESTRY COMMISSION OF BRITISH COLUMBIA.*

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Let me direct your attention westward—to the forest province where half the merchantable timber of Canada now stands. Let me describe to you the work of the Forestry Commission of British Columbia, and the circumstances that gave rise to its appointment.

In the early days on the Pacific coast of the Dominion the forest had little value. It was the farmer's enemy; it hindered the prospector on his hunt for gold; and the few thousand people whose settlements were scattered among the multitude of trees were hampered at every turn by the monstrous growth of wood. The commercial activity of the country was oppressed by it; the forest "encumbered the land." It is true that small sawmills had begun their work, but the local need for lumber was easily satisfied, the export trade was in its infancy, and insignificant cuttings along the waterfront—on the very fringe of the ceaseless forest—supplied the logger with all the timber he could sell.

It was inevitable therefore that the legislature of this small isolated population should have put no value upon the standing timber that it owned, and that the timber should have been given away to every purchaser of land—thrown into the bargain along with the deer and the berry bushes and the scenery. In fact even upon these attractive terms it was by no means easy to dispose of timber-land, for capital was scarce in those early days, and in any case it was not often available for a stumpage investment that by the look of things, might possibly require half a century to mature. Then came the great upheaval caused by the completion of the Canadian Pacific Railway—by the linking up of the Pacific coast country to the rest of Canada. Population flowed in, trade improved, and the choicest patches of the most accessible timber of British Columbia began to have a slight market value. Prompted by this, the legislature in 1888 made the first attempt to grapple with the problem of selling forest property. It placed a price of fifty cents upon every thousand feet of lumber cut—a price that has remained unaltered ever since.

Capital, as I have said before, was very scarce out west, and the struggling sawmill owner needed all that he possessed for the active development of his business. He could not easily afford to sink money in the purchase of timber lands. Hence that same legislature of 1888 organized the system of leasing Crown timber; a system that gave the lumberman all the stumpage that he needed without obliging him to pay cash for it. Moreover by granting these leases at the cheap rental of ten cents per acre to bona fide operators only the establishment of new sawmills in the province was given direct encouragement. For seventeen years this leasing system continued to exist as the standard method of disposing of the provincial forests, but long before its abolition a most important change had been made in the idea behind it, which had been originally, as I have said, the encouragement of immediate sawmilling operations in the province by grants of cheap Crown stumpage. In reality the first step towards the construction of the modern forest policy of the provincial government had been made. That step was simply the granting of leases at higher rates to non-operators, the throwing open of timberlands to the investor.

And now let me summarize the situation as it existed in 1905, the year in which the leasing of timber was brought to an end, the year that saw the adoption of a new and truly remarkable policy by the province of British Columbia. By that year, about one and a half million acres of the Crown timberlands had passed by sale or by railway grant into private ownership and out of government control; another million acres had been transferred to lessees. Probably thirty billion feet of standing timber had been alienated. Neither of the two forms of tenure secured to the people of the province any satisfactory share in the future value of the stumpage they parted with, for any future increase in the value of these two and a half million acres would benefit the private lessee or purchaser and not the government. As it was very evident that the value of British Columbia timber would rise greatly in the years to come, it was most desirable that some better method than lease or sale should be discovered for disposing of the Crown forests.

To quote the words of our Report "the legislative problem was solved in a most ingenious manner." In this year 1905, the government threw open the timberlands of the whole province. It invited private individuals to join it in a partnership in each and every square mile of the Crown forests. There was no sale, no auction, even no lease. The incoming partners were asked to sink no capital. The investor was merely asked to register a formal application to become a partner with the government in the timber on such-and-such a square mile of the province and the partnership was his. Stated in these attractive terms, the procedure sounds like some wild story of a commercial fairyland, where timberlands and wealth are given for the asking; but the truth is that a number of sound and useful "strings" were attached to these British Columbian gifts—and that, in fact, the gift idea was entirely absent from the mind of the provincial government. The government freely admitted investors to partnership in Crown timber, it is true, but it did so on its own terms absolutely, and it frankly admitted that only the future rise in stumpage and lumber values would enable it to say what these terms should be.

In fact, the partnership arrangement could have been stated thus; "Here," might have said the government, "are immense forests that will be put to no use for many years to come. They produce no revenue; they are in constant danger of destruction by fire; and it is beyond our power,

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